

# FERMION BACK-TO-BACK CORRELATIONS

T. Csörgő<sup>a</sup> Y. Hama<sup>b</sup> G. Krein, S. S. Padula, P. K. Panda<sup>c</sup>

<sup>a</sup>*MTA KFKI RMKI, H - 1525 Budapest 114, POB 49, Hungary*

<sup>b</sup>*Inst. Física, Univ. de São Paulo, C.P. 66318 - CEP 05315-970 São Paulo, Brazil*

<sup>c</sup>*Inst. Física Teórica, UNESP, Rua Pamplona 145, 01405-900 São Paulo - SP,  
Brazil*

---

*Presented by: Sandra S. Padula*

---

## Abstract

Bose-Einstein and Fermi-Dirac correlations produce opposed effects, as a result from quantum statistics: B-E enhances the the probability of observing pairs of identical bosons in similar momentum states, whereas, F-D suppresses it, when observing pairs of fermions with nearby momenta. Nevertheless, more recently, the so-called back-to-back correlations (BBC)<sup>1</sup> were predicted to appear between boson-antiboson pairs, if their masses were modified in a thermalized medium. We herewith show that a similar effect should manifest itself in the fermionic case. We find surprisingly large back-to-back correlations of observable fermion – anti-fermion pairs, similar in strength to the bosonic BBC found earlier. The back-to-back correlations of protons and anti-protons could be observed experimentally in  $^{197}\text{Au} + ^{197}\text{Au}$  collisions with  $\sqrt{s} = 200$  AGeV at the Relativistic Heavy Ion Collider (RHIC), at Brookhaven National Laboratory.

1. M. Asakawa and T. Csörgő, hep-ph/9612331, Heavy Ion Physics **4**, (1996) 233; M. Asakawa, T. Csörgő and M. Gyulassy, Phys. Rev. Lett. **83**, (1999) 4013.

---